

Remarks/Arguments:

Claims 1-8, 10, 15, 16, and 18-24 are the pending claims in this application.

Claims 1, 3, 5, 7, and 18-23 stand rejected under 35 U.S.C. § 102(b) as anticipated or alternatively as obvious over Foerster et al. (U.S. Patent No. 6,149,973). Claims 2, 4, 6, 8, 10, 15, and 16 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Foerster. Claim 24 stands rejected as unpatentable over Foerster in view of Twigg et al. (WO 2004/079167 evidenced by U.S. Publication No. 2007/0028604). Applicant respectfully traverses these rejections. For the reasons discussed below, the Applicant believes that these rejections are improper, and the claims distinguish over the cited references.

Rejections under 35 U.S.C. §102

Claims 1, 3, 5, 7, and 18-23 stand rejected under 35 U.S.C. § 102(b) as anticipated by Foerster et al. (U.S. Patent No. 6,149,973). Applicant traverses these rejections because Foerster fails to teach or suggest the claimed features.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." M.P.E.P. §2131 *citing Verdegaa Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Claim 1 recites, in part:

A method of manufacturing a catalysed **ceramic wall-flow filter** comprising a plurality of channels, which method comprising the steps of:

- (a) **reducing the pressure** in a pore structure of the channel walls relative to the surrounding atmospheric pressure **to provide evacuated channel walls,**
- (b) contacting a surface of the evacuated channel walls with a liquid containing at least one catalyst component or a precursor thereof, whereby **the liquid permeates the evacuated channel walls**

For instance, as is explained in the specification: "An advantage of the present invention is that, by removing the air from the pore structure of the ceramic wall-flow filter prior to contacting the surface of the channel walls, we have found that the permeation of the liquid in the channel walls is greatly facilitated." Thus, as claimed, there is a first step of reducing the

pressure to provide evacuated channel walls and a second step of contacting the surface of the evacuated channel walls with the catalyst component/precursor.

Foerster relates to a process for coating flow channels of a honeycomb form catalyst carrier by filling the vertically oriented flow channels with the coating dispersion and subsequently emptying the flow channels by connection of a vacuum tank. See col. 4, lines 33-54 of Foerster. The claimed invention, however, relates to a ceramic wall-flow filter. As is explained in the specification at pg 2, lines 11-18:

A typical wall-flow filter has a shape of a honeycomb, the honeycomb having an inlet end and an outlet end, and a plurality of cells extending from the inlet end to the outlet end, the cells having porous walls wherein part of the total number of cells at the inlet end are plugged along a portion of their lengths, and the remaining part of the cells that are open at the inlet end are plugged at the outlet end along a portion of their lengths, so that a flowing exhaust gas stream passing through the cells of the honeycomb from the inlet end flows into the open cells, through the cell walls, and out of the filter through the open cells at the outlet end.

Thus, while a wall-flow filter has the *shape* of a honeycomb carrier, it is different from a honeycomb carrier in that in a wall-flow filter, the flow path of all of the gas is *across* the walls.¹ Foerster discloses a honeycomb *flow-through* catalyst in which the catalyst flows along the length of the channels of the honeycomb, contacting catalyst as it flows axially. Foerster never expressly discloses or contemplates a wall-flow filter, let alone a wall-flow filter which has evacuated channel walls. Because Foerster fails to teach or suggest the claimed features, claim 1 is not anticipated by Foerster. Claims 2-8, 10, 15, 16, and 22-24 depend from claim 1, and therefore should each be allowed as dependent thereon.

The Office Action asserts "one embodiment of Foerster is to first apply the vacuum (step 5, column 7, lines 16-18), which would provide isolated and evacuated channels, and then have the evacuated channel walls contacted with the liquid (step 4, column 7, lines 12-14)."
Applicant respectfully disagrees with this characterization of Foerster. Foerster never indicates that the vacuum step may be applied first, namely as a discrete step before the step of contacting the substrate with a liquid. On the contrary, Foerster discusses the vacuum concept

¹ For more information on wall-flow filters, please see *Catalytic Air Pollution Control, Commercial Technology*, Second Edition by Heck et al., John Wiley & Sons 2002, pgs. 212-229 (enclosed). In particular, see Figure 9.5 showing the wall-flow filter concept with alternate plugged cells.

in only one of two ways: (1) removing the coating dispersion from the flow channels, i.e., extraction impulse (throughout Foerster; See e.g., col. 5, lines 45-53); or (2) filling the flow channels by application of a partial vacuum (col. 5, lines 18-22 of Foerster). In the invention as claimed in step (a) of claim 1, however, the vacuum is not applied for either of these reasons. Rather, the vacuum is first applied to provide the evacuated channel walls such that when they are contacted with the catalyst component/precursor (e.g., pumped in), better permeation of the liquid in the channel walls occurs. See pg. 11, lines 5-18 of the specification ("Since the pore structure of the filter material has been evacuated, the liquid components permeate the walls of the channels.").

Furthermore, Foerster never contemplates reversing or changing the order of the steps. The Office Action asserts "Foerster does not require steps 4 and 5 of its process to be performed in a particular sequence and the steps themselves do not necessitate that one precede the other." Office Action Pg. 2. Applicant respectfully disagrees. Foerster clearly specifies (a) filling the flow channels, then (b) emptying the flow channels by an extraction impulse. As explained in Foerster at col. 5, lines 45-58:

The extraction impulse is generated by means of a vacuum tank, which is connected with the bottom face of the catalyst carrier. Preferably, the vacuum tank is evacuated at a partial vacuum of at least 150 mbar. Through creation of the connection between the bottom face of the catalyst carrier and the vacuum tank, the coating dispersion is removed from the flow channels within a short time span of 1 to 1.5 seconds. The in-rushing air opens any flow channels that are still blocked, which, within the context of this invention, is characterized as clearance extraction, and leads to a reduction of the partial vacuum in the vacuum tank and thus to a continuous decrease in the flow rate of the air in the flow channels.

Foerster does not contemplate reversing or changing the order of the steps. Foerster simply does not teach or suggest reducing the pressure to provide evacuated channel walls prior to contacting the surface of the evacuated channel walls with the catalyst component/precursor. In particular, Foerster fails to teach or suggest this while the pressure is reduced, as claimed in claim 3. For these reasons also, Applicant respectfully submits that claims 1-8, 10, 15, 16, and 18-24 are patentable over Foerster.

Claim 3 is believed to be patentable for the reasons discussed above in connection with claim 1, on which claim 3 is dependent. Claim 3 recites, in part, that "the pressure reduction in the pore structure of the channel walls is maintained during the liquid contacting step." While

Foerster mentions filling the flow channels by applying a partial pressure, it certainly does not disclose both applying the vacuum as a discrete step before contacting the substrate with a liquid (as claimed in claim 1) and applying a vacuum during the liquid contacting step.

Claim 18, while not identical to claim 1, recites similar features. For example, claim 18 recites that the apparatus is for use in manufacturing a **catalysed ceramic wall-flow filter having filter walls** and goes on to specify: "means for reducing pressure in the **isolated channels** to below the surrounding atmospheric pressure thereby to establish a vacuum in the **pore structure of the filter walls** to provide **isolated and evacuated channels**, at least one reservoir for holding a liquid containing at least one catalyst component or a precursor thereof and **means for dosing the isolated and evacuated channels** with a pre-determined quantity of the liquid." As Foerster fails to teach or suggest the features claimed in claim 18 for the same reasons as discussed above in connection with claim 1, claim 18 is not anticipated by Foerster. Claims 19-21 depend from claim 18, and therefore should each be allowed as dependent thereon.

Rejections under 35 U.S.C. §103

Alternatively, claims 1, 3, 5, 7, and 18-23 stand rejected as obvious over Foerster. Claims 2, 4, 6, 8, 10, 15, and 16 stand rejected as unpatentable over Foerster. Claim 24 stands rejected as unpatentable over Foerster in view of Twigg et al. (WO 2004/079167 evidenced by U.S. Publication No. 2007/0028604). Applicant respectfully traverses these rejections and submits that the currently pending claims are patentable over the cited references for at least the reasons set forth herein.

"To establish a *prima facie* case of obviousness, ... the prior art reference (or references when combined) must teach or suggest all the claim limitations." M.P.E.P. §2143. Additionally, as set forth by the Supreme Court in KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398 (2007), it is necessary to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the prior art elements in the manner claimed. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). See M.P.E.P. § 2141.02(VI).

As indicated above, Foerster fails to teach or suggest all of the claim limitations. Furthermore, it would not have been obvious to evacuate the channel walls first because there

is no reason provided to do so. The evacuated channel walls are important in the claimed invention because of the nature of a wall-flow filter. See e.g., pg. 2, lines 11-18 of the specification. While some porosity may exist in a honeycomb flow-through carrier, it is designed to permit axial flow along the channels, not flow across the walls. In fact, if alternating ends of a typical honeycomb carrier were plugged to attempt to drive the flow across its walls, the resulting back pressure would become impracticably high. Stated another way, the walls of a honeycomb carrier are essentially impermeable to the flowing gas, while the walls of a wall-flow filter certainly allow gas to flow across them. As a consequence, it would not have been obvious to evacuate the channel walls of the honeycomb carrier because there would be no reason to do so in view of the differing nature of a honeycomb flow-through carrier and a wall-flow filter. As no reason is provided that would have prompted a person of ordinary skill art to evacuate the channels of the honeycomb carrier of Foerster, a *prima facie* case of obviousness has not been established.

Moreover, in addition to the arguments presented above, and again with emphasis on claim 3, Foerster, in fact, teaches away from the claimed invention. With respect to the extraction impulse, Foerster seeks to apply a vacuum for "rapid emptying" and to "secure prevention of blocked flow channels." The partial vacuum is the "driving force for removal of the coating dispersion from the flow channels and for the subsequent air flow." See col. 5, line 40 through col. 6, line 6 of the specification. As already discussed, the claimed invention seeks to allow the catalyst component/precursor to permeate the channels walls. It is because the pore structure of the filter material has been evacuated that the liquid components permeate the walls of the channels to the extent achieved by the present invention. Pg. 11, lines 5-18 of the specification. Thus, Foerster teaches away from the claimed invention by teaching use of the vacuum for rapid emptying/extraction of the coating.

As Foerster fails to teach each of the claimed limitations, no reason is provided, and Foerster teaches away from the claimed invention, Applicant respectfully submits a *prima facie* case of obviousness has not been established. Thus, claim 1 should be in condition for allowance. Claims 2-8, 10, 15, 16, and 22-24 depend from claim 1, and therefore should each be allowed as dependent thereon.

With respect to claim 2, which recites, in part, "steps (b) and (c) are repeated at least once prior to step (d)," the prior Office Action states, "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to reapply the catalyst-impregnated liquid

and drying prior to calcining the filter if the first coating does not provide a sufficient amount of particulates to provide the requisite amount of surface area.” Applicant respectfully disagrees. Foerster again teaches away from the concept of reapplying the coating. As explained at col. 2, lines 24-31 of Foerster:

Processes for the application of the dispersion coating on the catalyst carriers must have a high productivity with low amounts of rejects. They must therefore make it possible to apply the entire quantity of coating on the catalyst carrier in a single operational cycle. Multiple coatings to attain the required coating thickness should be avoided.

Thus, a person having ordinary skill in the art would seek to produce the filters using a single application cycle, which is directly contrary to claim 2. As explained in the specification, “this enables different catalyst components or their precursors to be prepared and loaded onto the filter separately where there may be some incompatibility between two formulations.” Pg. 4, lines 8-10 of the specification. Accordingly, a *prima facie* case of obviousness has not been established, and claim 2 should be in condition for allowance.

Claim 18, while not identical to claim 1, recites similar features as mentioned above. As Foerster fails to teach or suggest the features of claim 18, a *prima facie* case of obviousness has not been established. Claims 19-21 depend from claim 18, and therefore should each be allowed as dependent thereon.

Claim 24 stands rejected as unpatentable over Foerster in view of Twigg et al. (WO 2004/079167 evidenced by U.S. Publication No. 2007/0028604). WO 2004/079167 qualifies as prior art under 35 U.S.C. § 102(e), but not under Section 102(b) or 102(a). At the time of the invention, the subject matter of WO 2004/079167 and the claimed invention were owned by the same entity, namely Johnson Matthey PLC. Under 35 U.S.C. § 103(c)(1), such references cannot be used to preclude patentability based on obviousness, so this rejection must be withdrawn.

Conclusion

For all of the foregoing reasons, Applicant respectfully requests reconsideration and allowance of the claims. Applicant invites the Examiner to contact his undersigned representative if it appears that this may expedite examination.

Respectfully submitted,



Christopher R. Lewis, Reg. No. 36,201
Attorney for Applicant

CRL/CEB/Irb

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Enclosure

P.O. Box 980
Valley Forge, PA 19482
(610) 407-0700

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